



复旦微电子

# ***FM13DT160 Demo***

*Smart Phone APP User Guide*

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**2021.02**

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# 1 FM13DT160 Sample

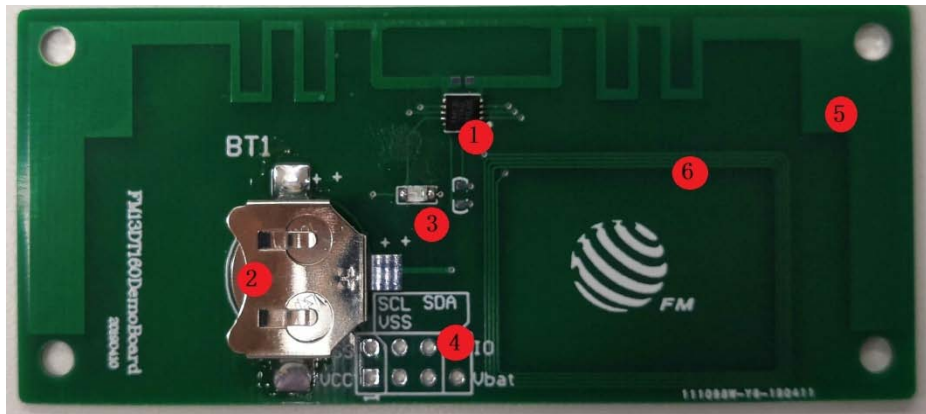


Figure 1: Top view of the demo PCB

This demonstrator circuit board consists of the following:

- 1、 FM13DT160 IC in COB package.
- 2、 Coin cell Battery for stand-alone operations [1]
- 3、 LED
- 4、 All PINs of the IC (for I2C interface with External MCU)
- 5、 Antenna coil connections IN+ and IN-, connected with the UHF antenna
- 6、 Antenna coil connections IN1 and IN2, connected with the HF antenna

Note [1]: Coin cell Battery Recommended info

Japan			IEC	China	Voltage (V)	Diameter*Thickness (mm)
AG10	LR54	389	SR1130	189	<b>1.5</b>	11.6*3.1

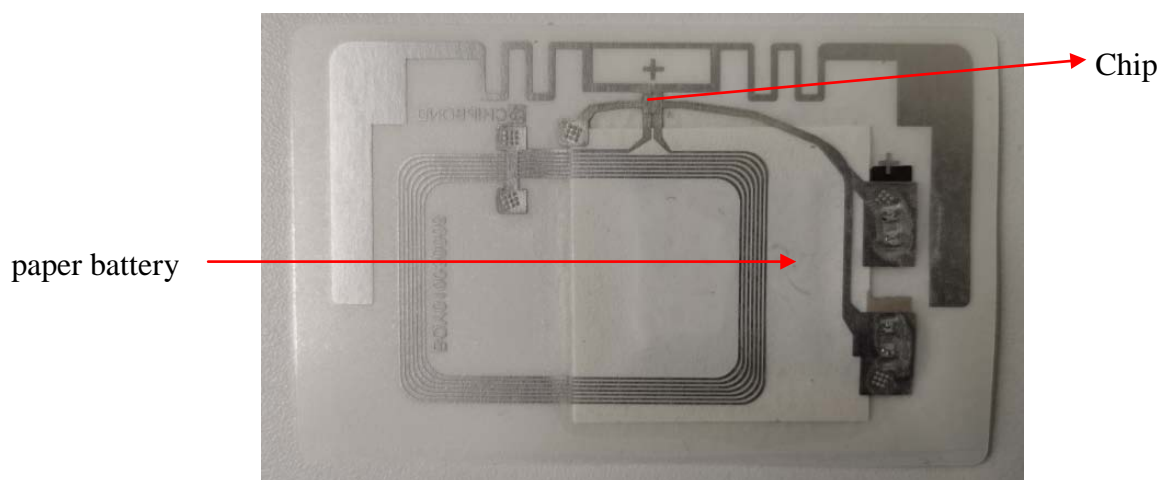


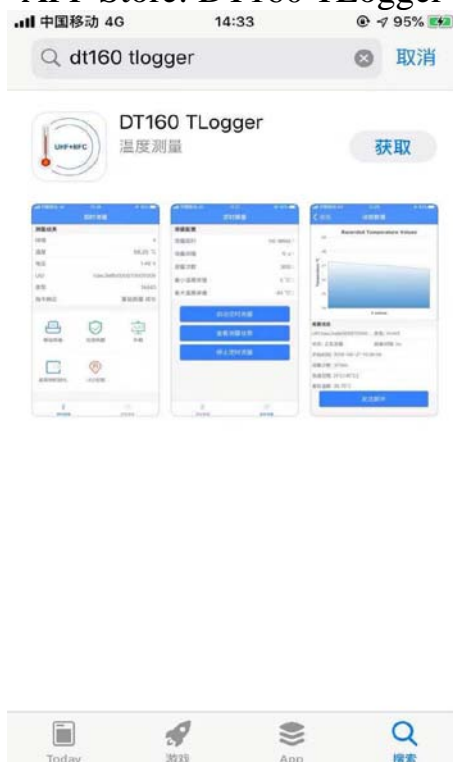
Figure 2: Top view of the Inlay Demo

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## 2 Phone APP Download

Android:  
(The APP APK contact with FMSH)

IOS:  
(version: IOS13 up)  
APP Store: DT160 TLogger



Note: APP supports English, and the phone system language is set to English and APP will automatically switch

# 3 Android phone Quick Start

## 3.1 Single time measurement

1. Launch the Android App, initial interface shown in Figure 2 as below.

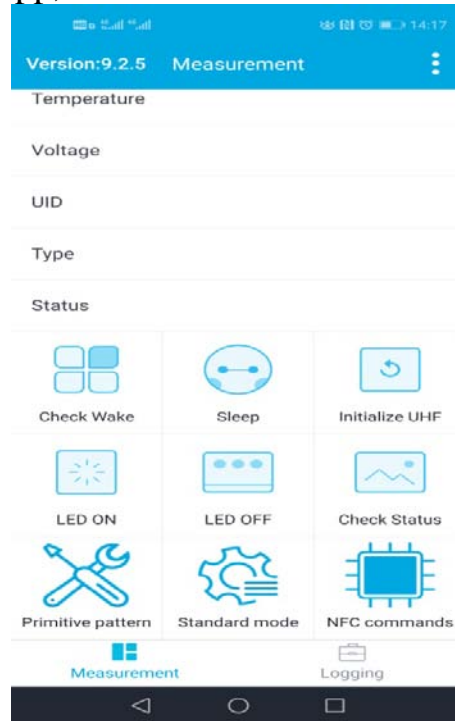


Figure 3: Initial screen after launching the Android app.

2. Hold the FM13DT160 demonstrator close to your smart phone. The Tag UID, Temperature, Battery Voltage eg will be displayed as below once a tag is found.

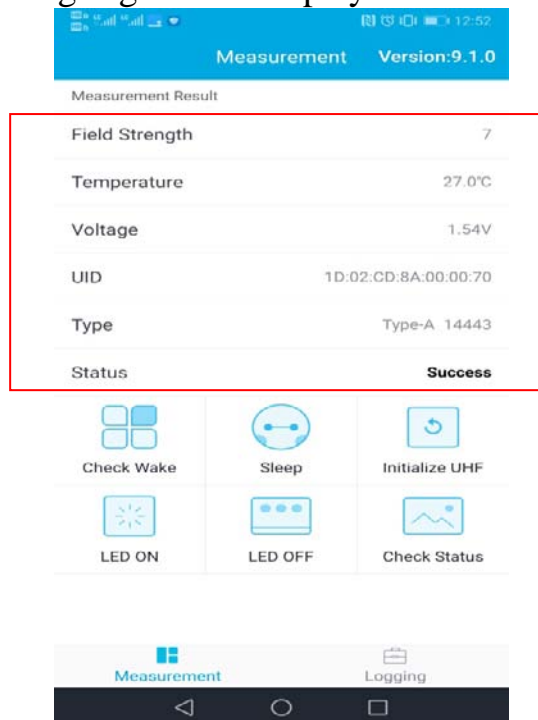


Figure 4: The status of the current connection and communication is displayed

## 3.2 Mode configuration

DT160 temperature data support a variety of storage methods, different storage modes to meet different application requirements, customers can configure labels to work in the appropriate storage mode according to their own needs.

DEMO configuration implementation of two modes for reference.

### 3.2.1 Normal Mode Configuration

The normal mode supports 2 formats and 4864 temperature data points.

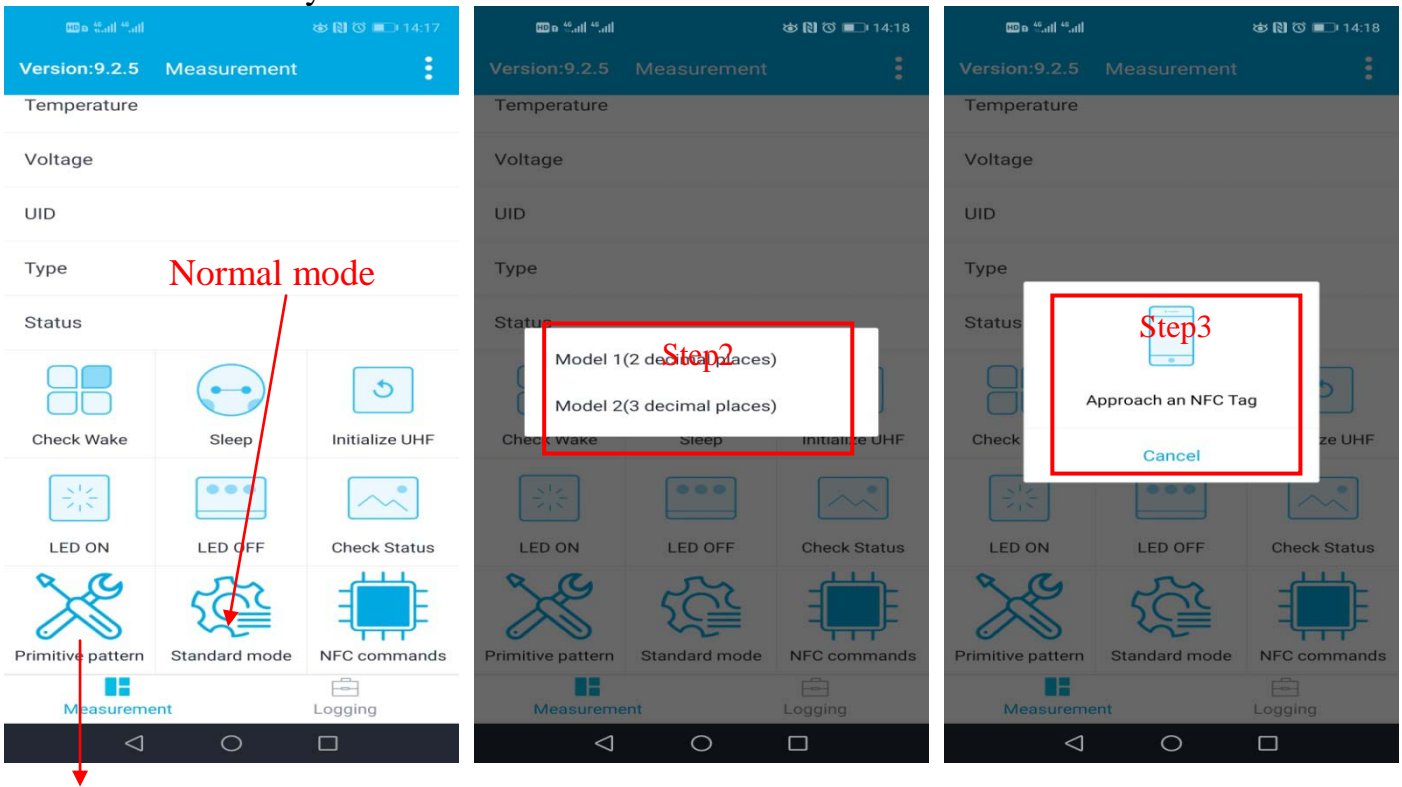
#### Format 1:

2 decimal points, temperature data display resolution  $0.25^{\circ}\text{C}$ ,  
temperature display range- $128\sim 127^{\circ}\text{C}$ , **default mode**.

#### Format 2:

3 decimal points, temperature data display resolution  $0.125^{\circ}\text{C}$ ,  
temperature display range- $64\sim 63^{\circ}\text{C}$

Each block can only store the measurement results once.



Original data mode

### 3.2.2 Original data mode configuration

For this mode, the original data measurement results are saved without processing, the original data is only 13 bit, and the temperature data are calculated by formula.

Each block can store only 2 measurement results.

### 3.3 Logging Temperature

#### 3.3.1 Start Logging Setting

1) After click the Logging button and setting the relevant parameters,turn on the Start Logging button.

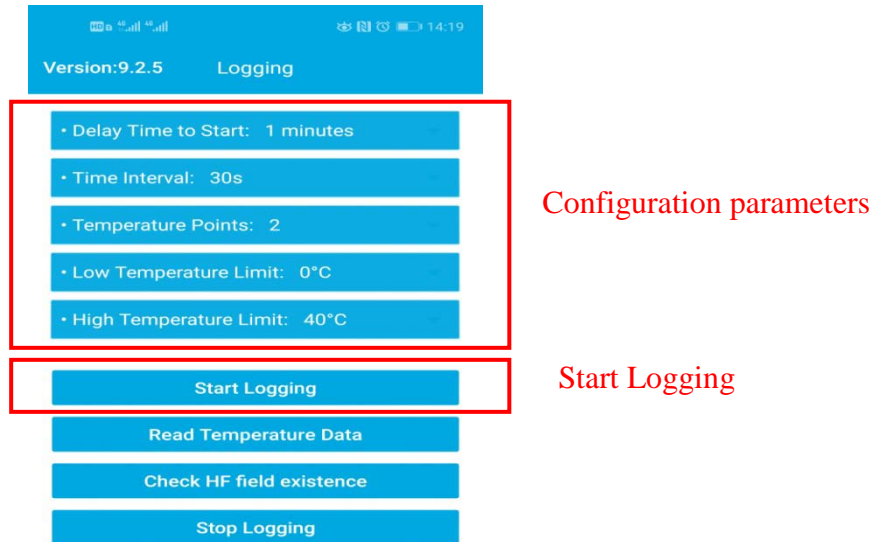


Figure 5 Logging setting and start logging process for logger temp testing

2) Approach the Tag, and The tag is starting logging process

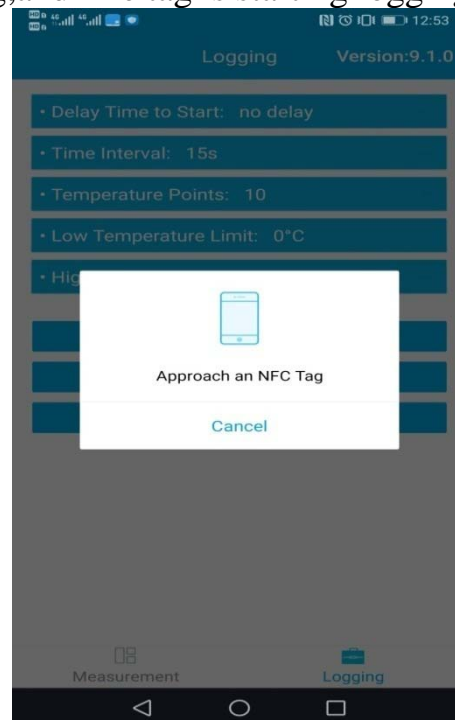


Figure 6 start logging



### 3.3.2 Logging temperature data read

1) Wait for demo automatic test temperature 10 times (LED flicker 10 times the labe has no LED). Switch APP to the record read interface and let it close the demo board.

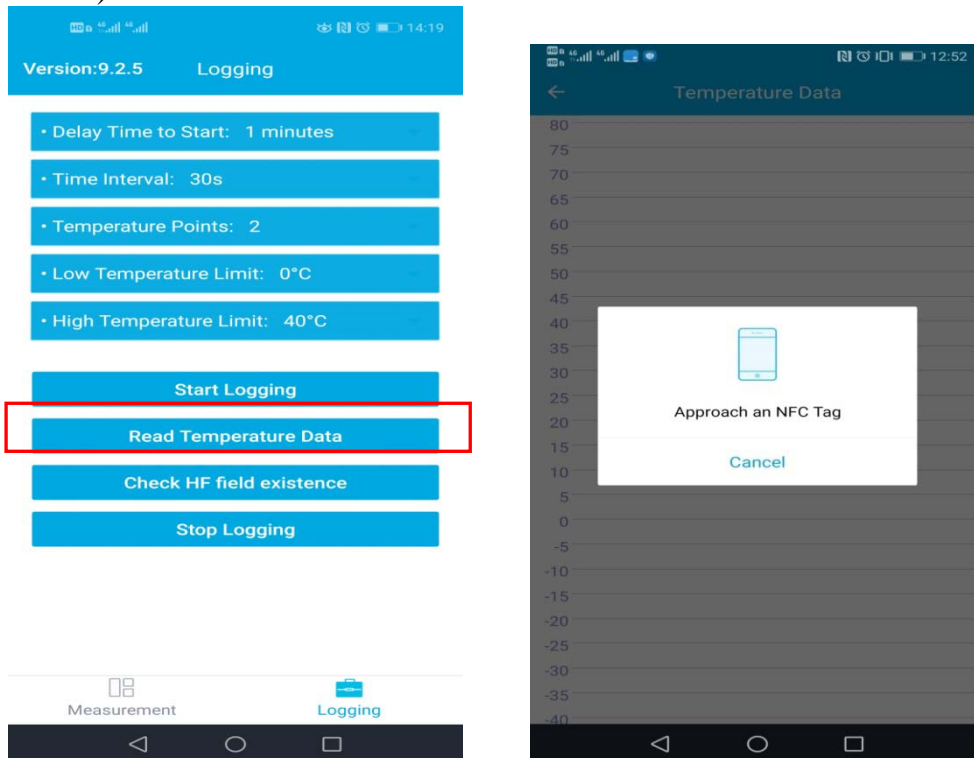


Figure 7 start read logging temperature data curves after finished measurement

2) APP will display the logging temperature data curves and hints automatically.

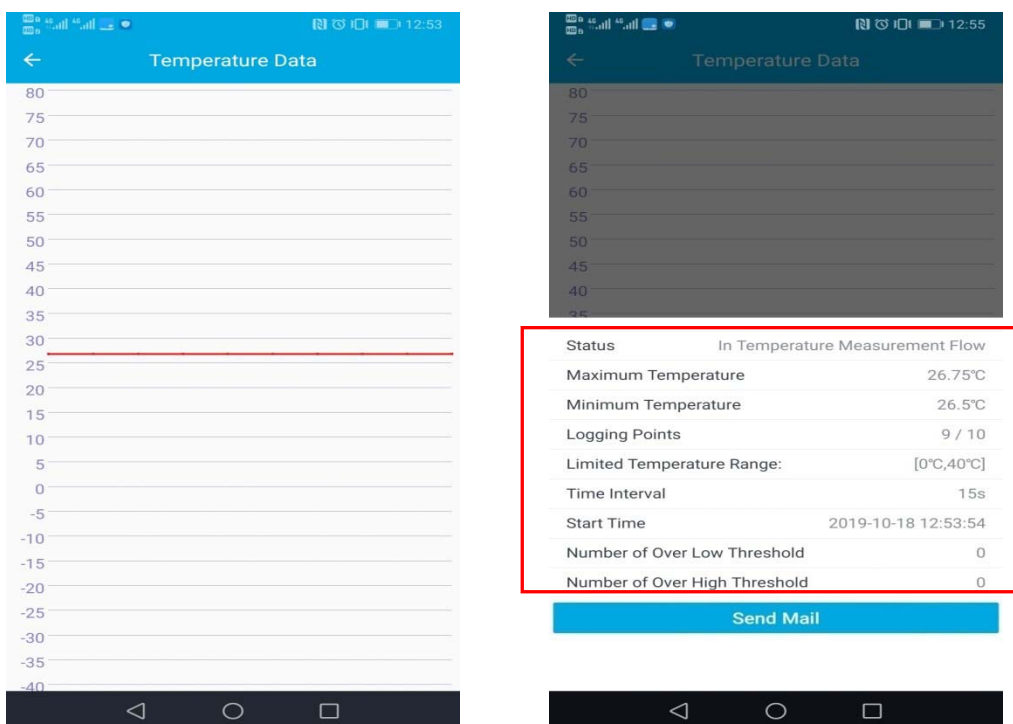
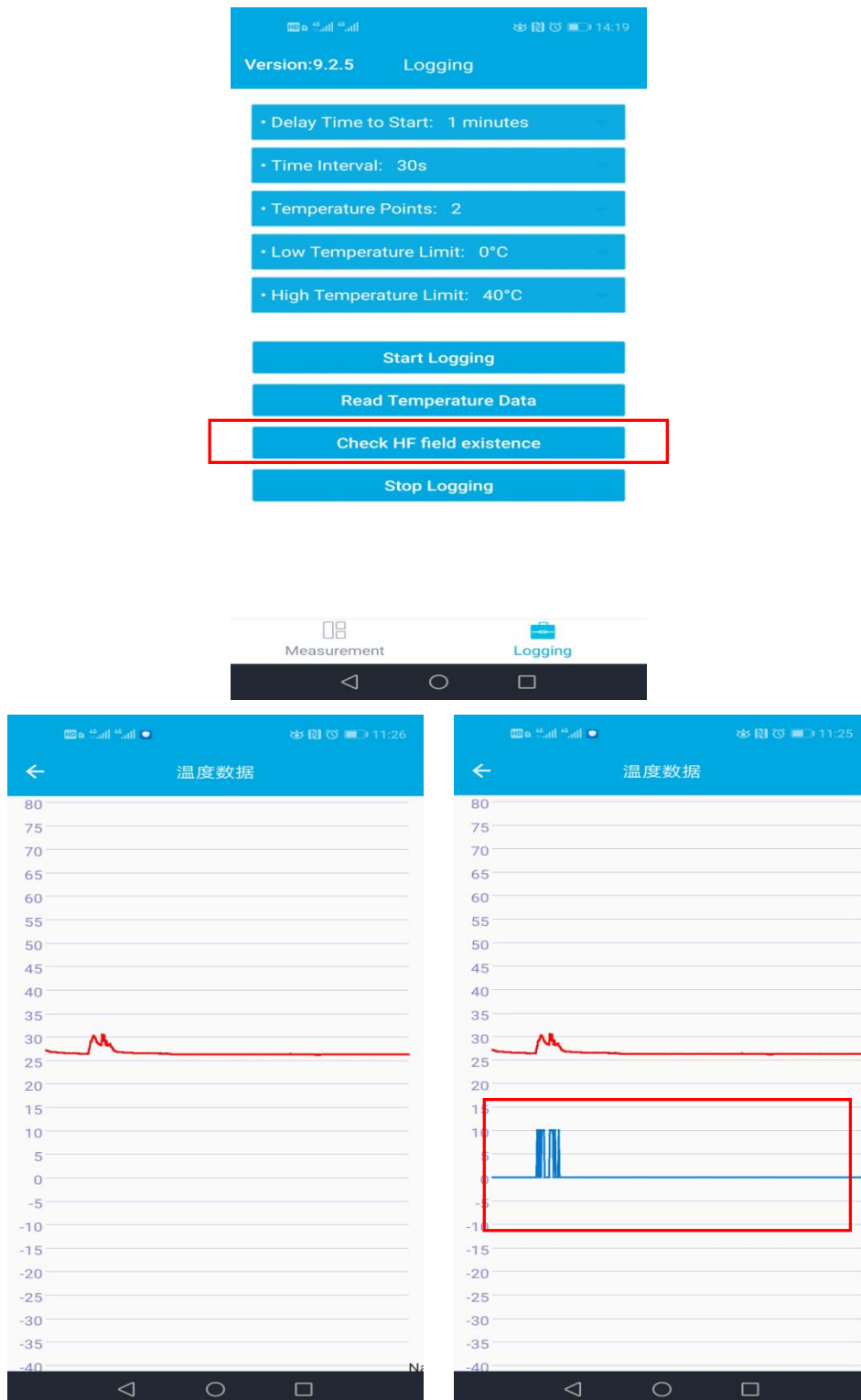


Figure 8 logging temperature data curves after finished measurement

### 3.3.3 Check HF Field Existence

When the high frequency field strength is detected in the RTC logging process, the corresponding flag will be saved in the standard storage mode data recording process. DEMO software handles the blue curve to indicate whether there is a field strength in the process of logging, which leads to the increase of temperature detection temperature.



### 3.3.4 Data file reports

1) Logging temperature data support PDF file format and Execl file format, click the corresponding format button

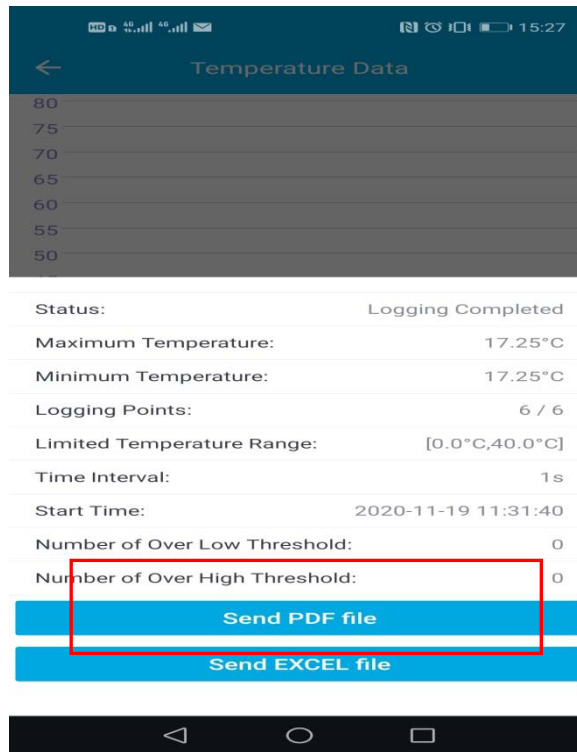
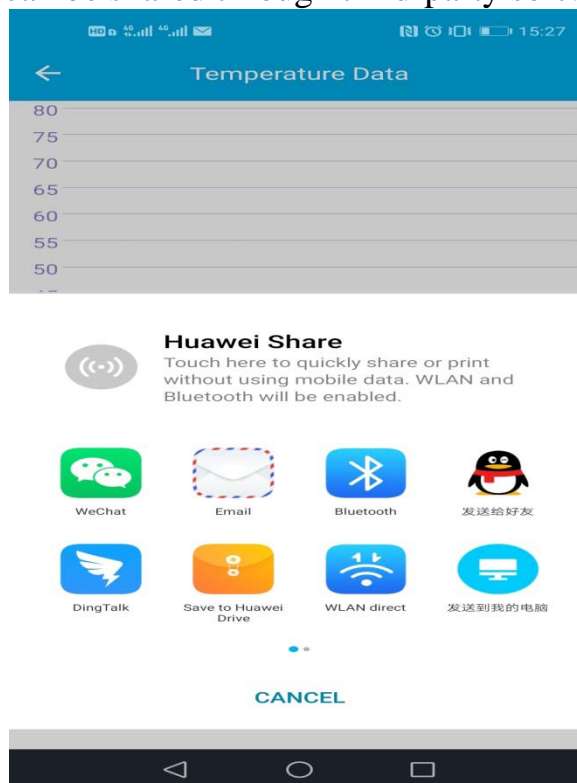
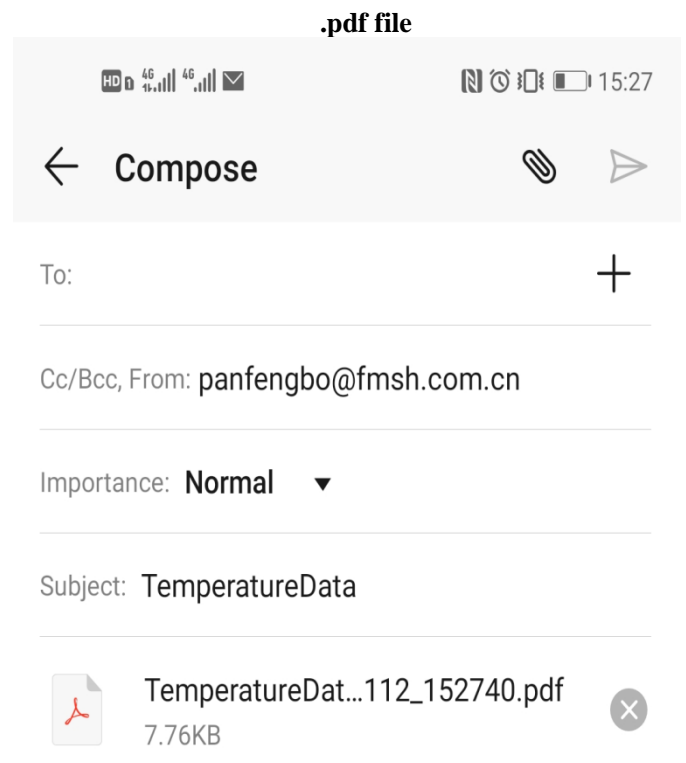
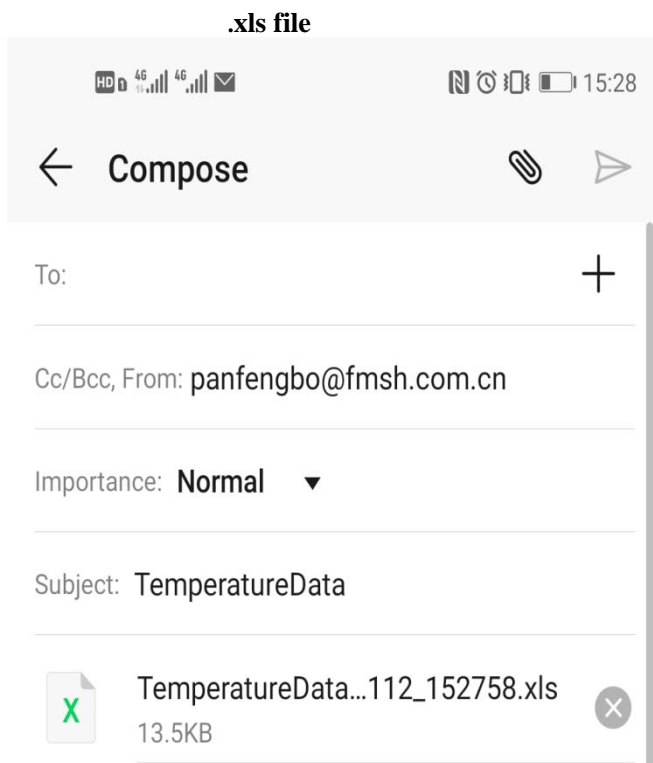


Figure 9 Send Mail control

2) generated data files can be shared through third-party software



3) For example, the data files generated by mail refer to



4) Generating Document Content Reference

Status	Logging Completed
Maximum Temperature	28.75°C
Minimum Temperature	27.5°C
Logging Points	10 / 10
Limited Temperature Range:	[0°C,40°C]
Time Interval	15s
Start Time	2019-10-18 17:24:48
Number of Over Low Threshold	0
Number of Over High Threshold	0
2019-10-18 17:24:48	28.75°C
2019-10-18 17:25:03	27.75°C
2019-10-18 17:25:18	27.5°C
2019-10-18 17:25:33	27.5°C
2019-10-18 17:25:48	27.5°C
2019-10-18 17:26:03	27.5°C
2019-10-18 17:26:18	28.25°C
2019-10-18 17:26:33	27.5°C
2019-10-18 17:26:48	27.5°C
2019-10-18 17:27:03	27.5°C

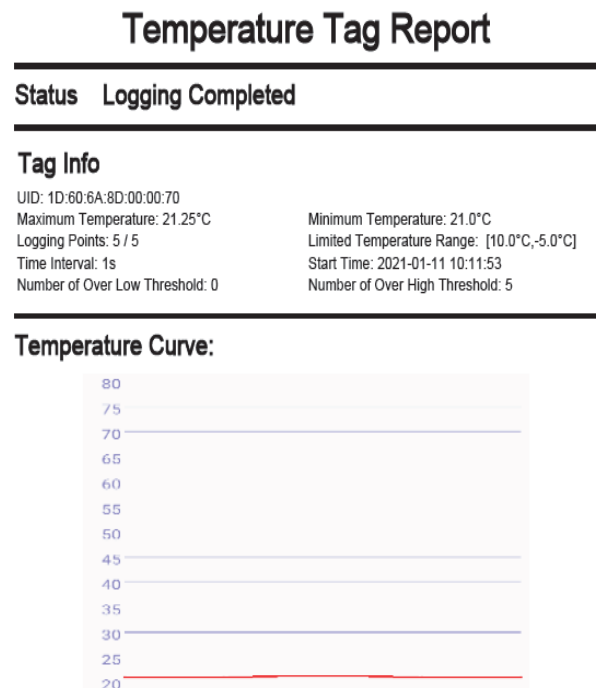


Figure 10: TemperatureData.xls report

### 3.4 LED control function

1. Turn on the LED ON button then show Approach an NFC tag interface .  
Let Demo close to the NFC area of the mobile phone

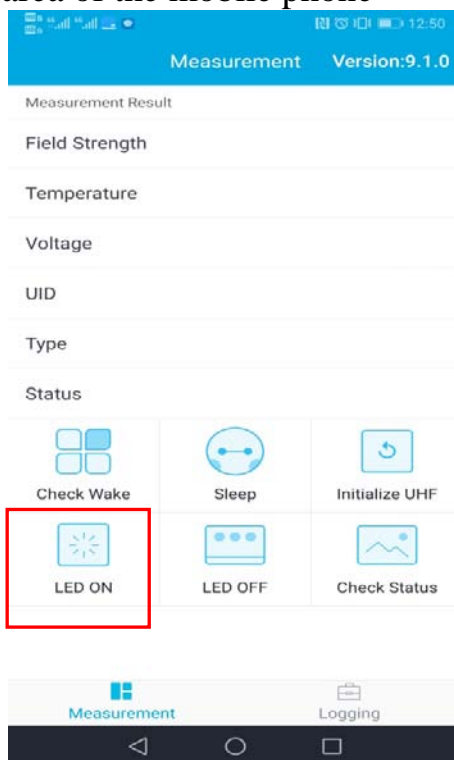


Figure 11: LED ON control

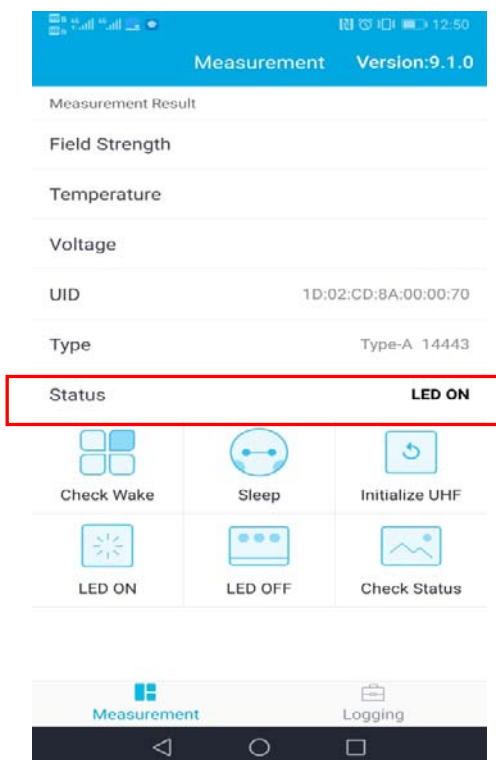


Figure 12: LED ON status

2. Turn off the LED ON button then show Approach an NFC tag interface .  
Let Demo close to the NFC area of the mobile phone

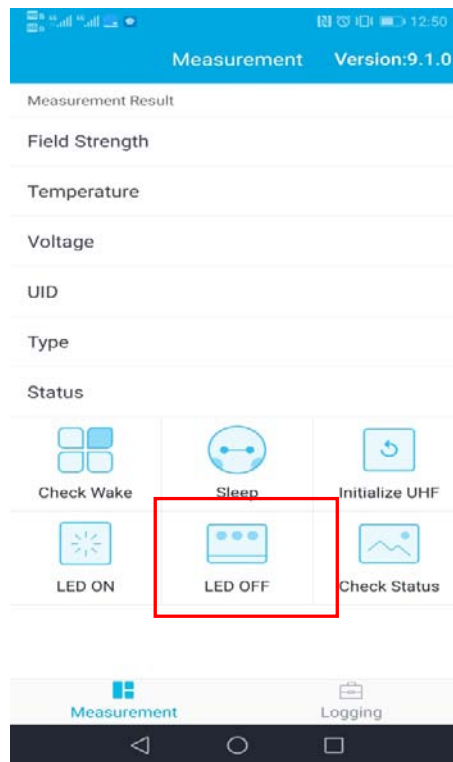


Figure 13: LED OFF control

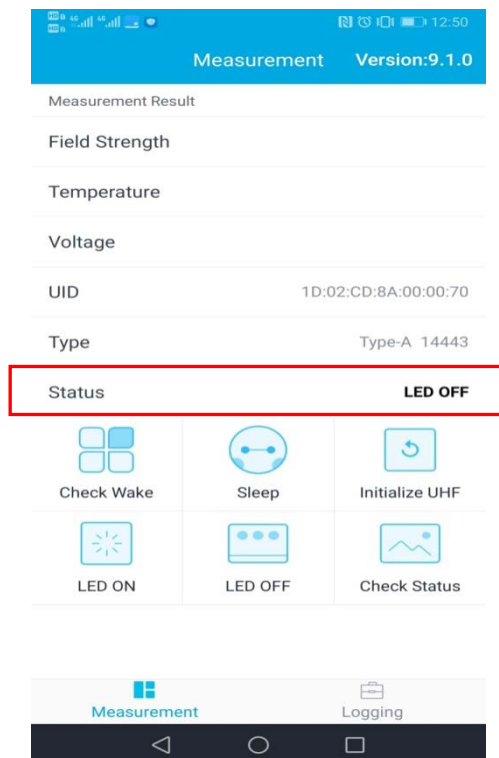


Figure 14: LED OFF control status

### 3.5 EPC Init REG

During the test, if the battery is re-energized after removal, the EPC parameters need to be reloaded. The control button is Initialize UHF.

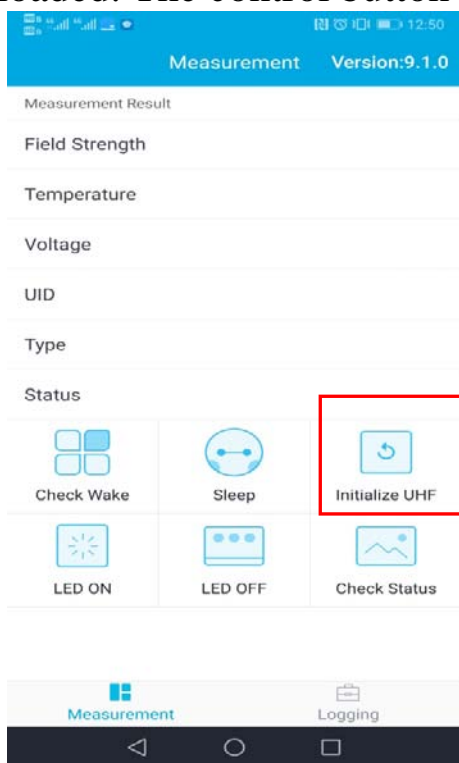


Figure 15: Initial regfile once the battery is re-energized for EPC reloading

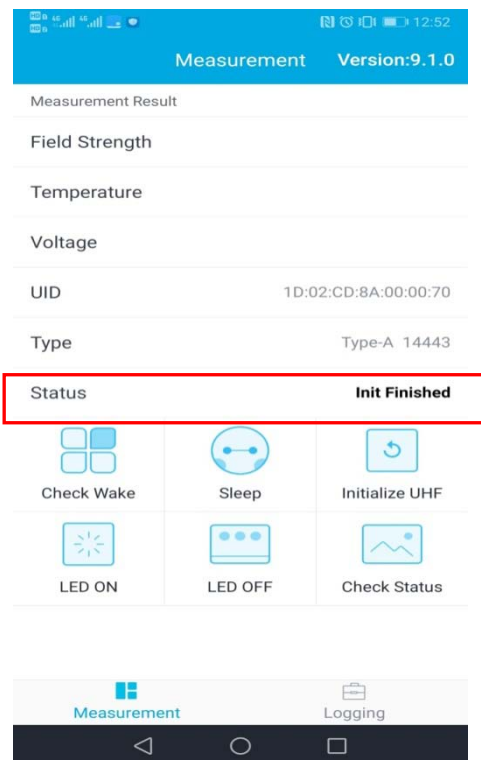


Figure 16: Initialize UHF control state

## 3.6 Check Status

1. Turn on the check status button.

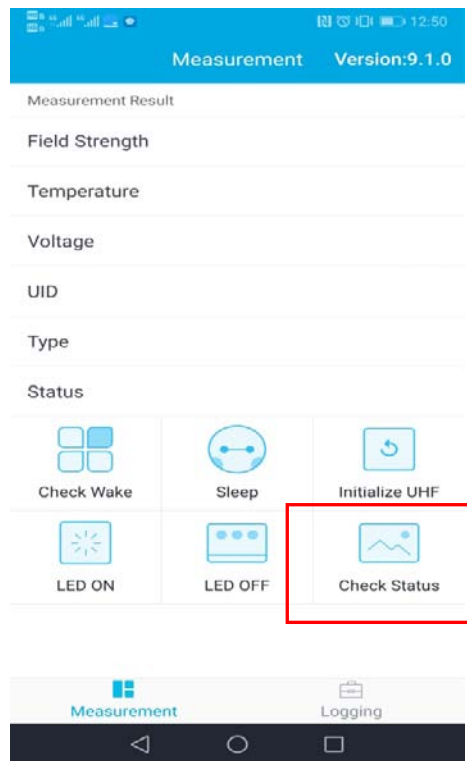


Figure 17: check status command interface

2. APP will display the tag status

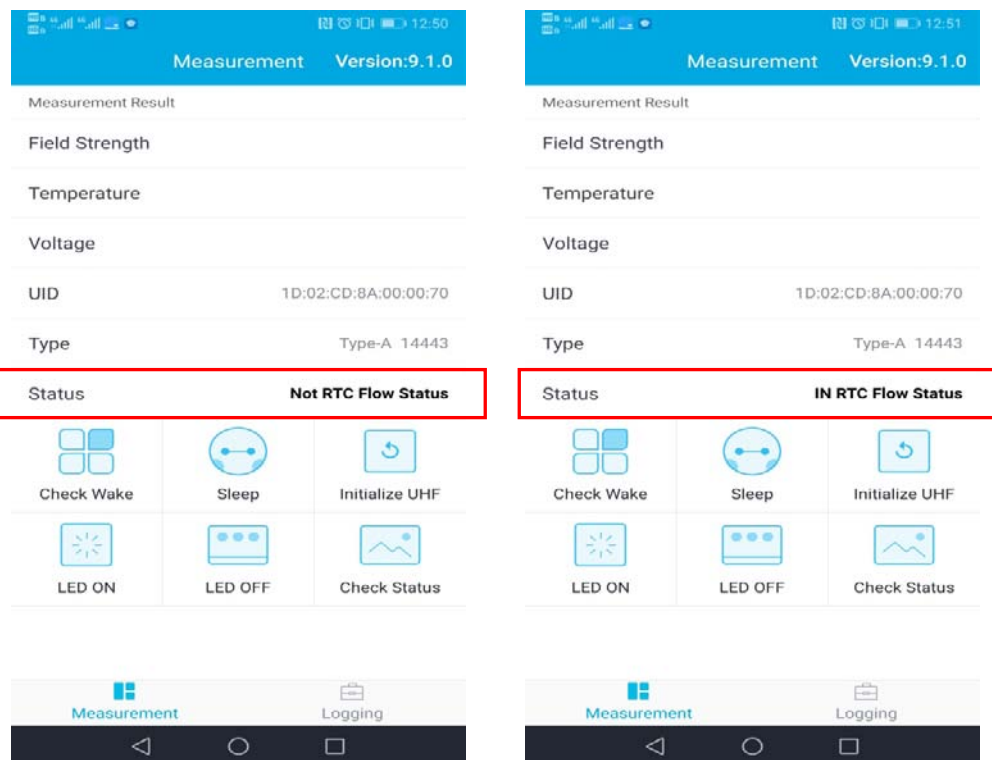


Figure 18: check status



## 3.7 Check Wake Status

1. Turn on the check wake button.

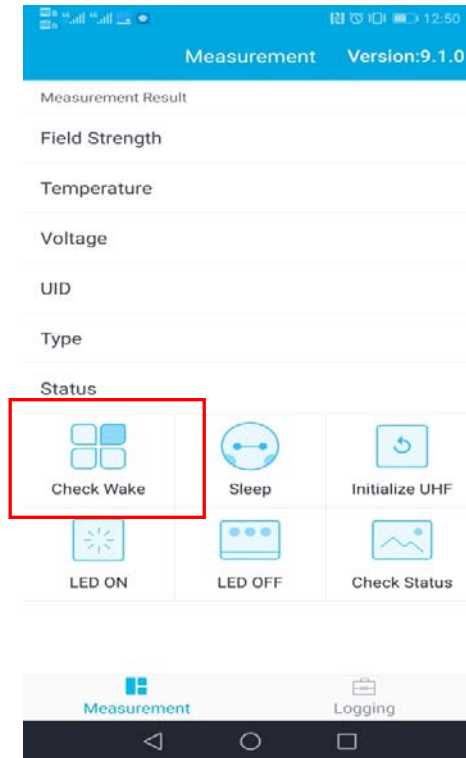


Figure 19: check status command interface

2. APP will display the tag status

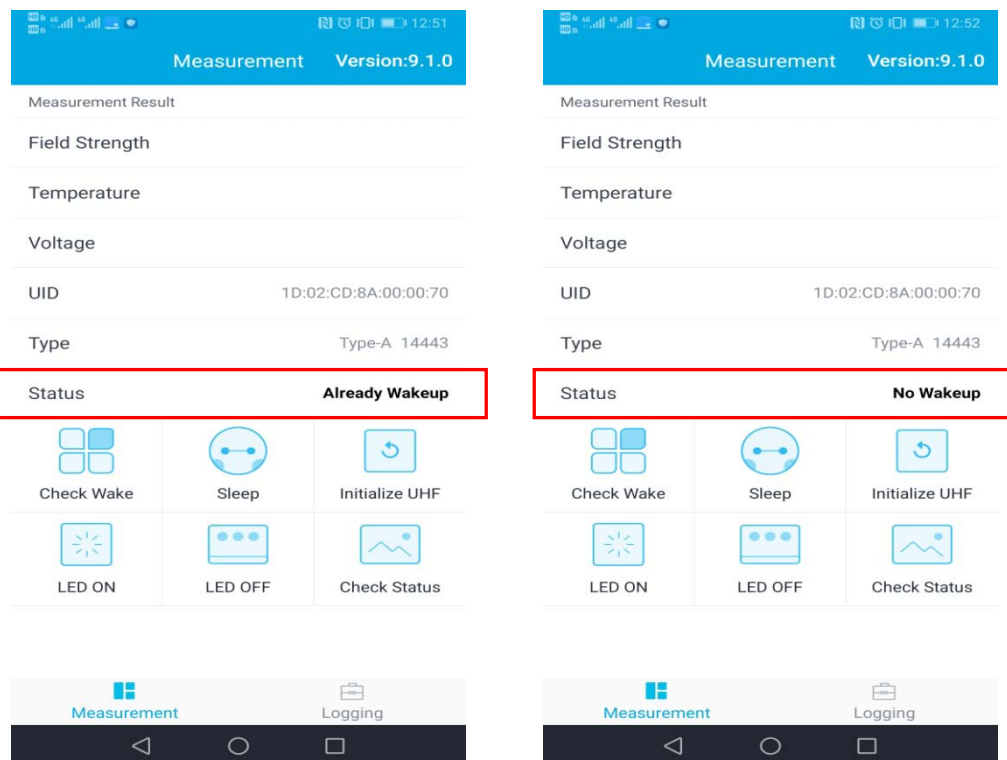


Figure 18: check status

## 3.8 Password

### 3.8.1 Password Function Description

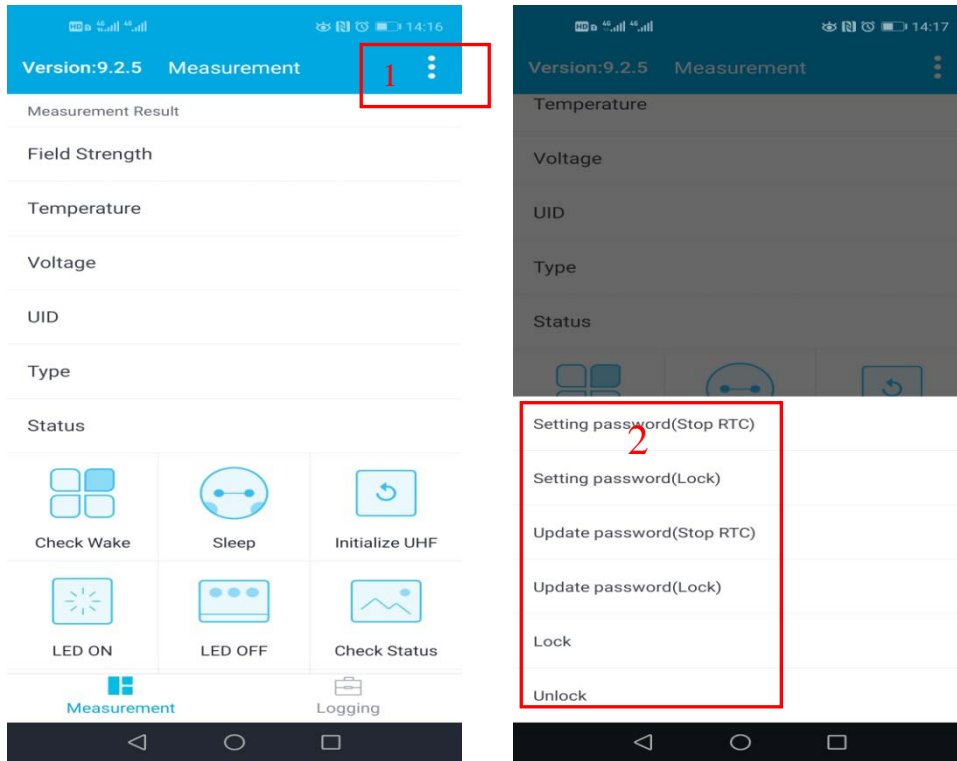
DT160 mainly support 2 Password functions:

1) **RTC STOP Password:** RTC Logging process requires sending Stop instructions to stop logging process, The default key password is full 00000000, the password does not take effect; once modified to incomplete 0, effective.

2) **Lock Password:** lock the user configuration area (Sector1, Sector2, Sector3) if you need to modify the user configuration area unlock. Data required lock password default is also full 00000000, once modified to incomplete 0, effective.

Operation process:

- 1) click on the upper right corner... Go to the corresponding settings interface
- 2) click on the corresponding functional options to enter the relevant settings operation flow interface

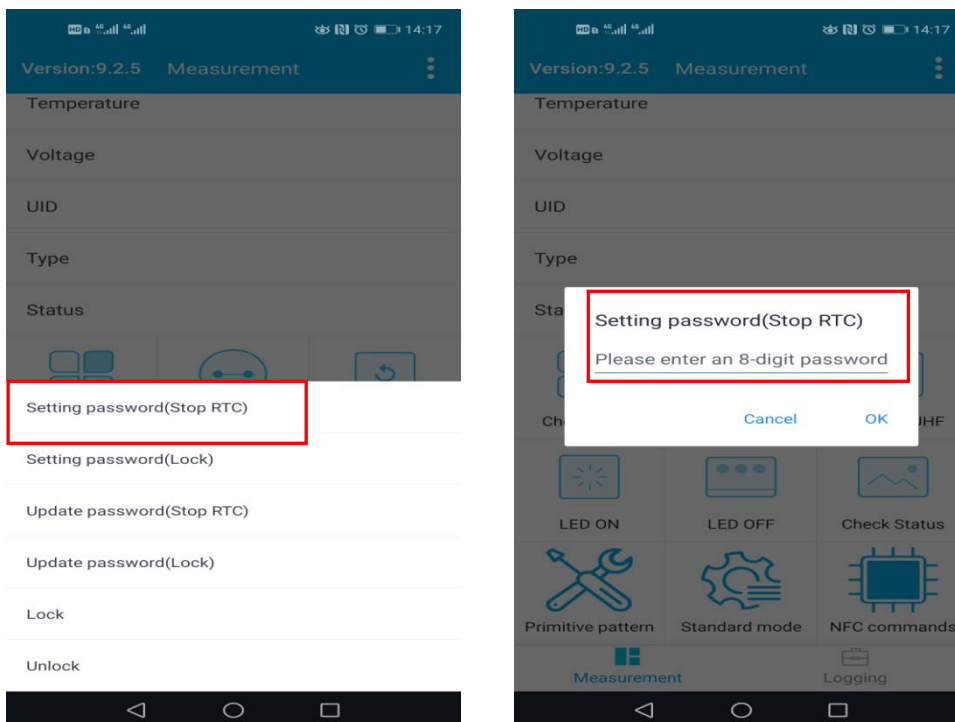


Note:

Once the demo is locked the relevant sector, needs 18nlock to perform the relevant tests, Otherwise, part of the demo function operation will fail.

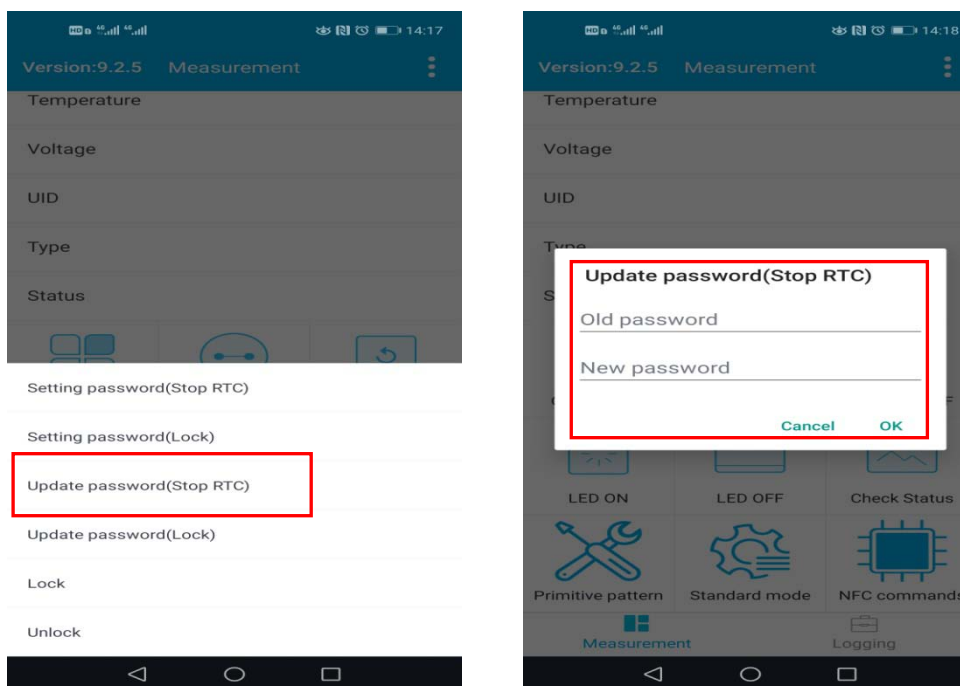
### 3.8.2 Set RTC stop password

Click the **Setting password (Stop RTC)** option, enter the Setting password interface to be set, enter the password, then click the OK button, enter please close to the NFC label interface, make phone near the label to complete the first password settings



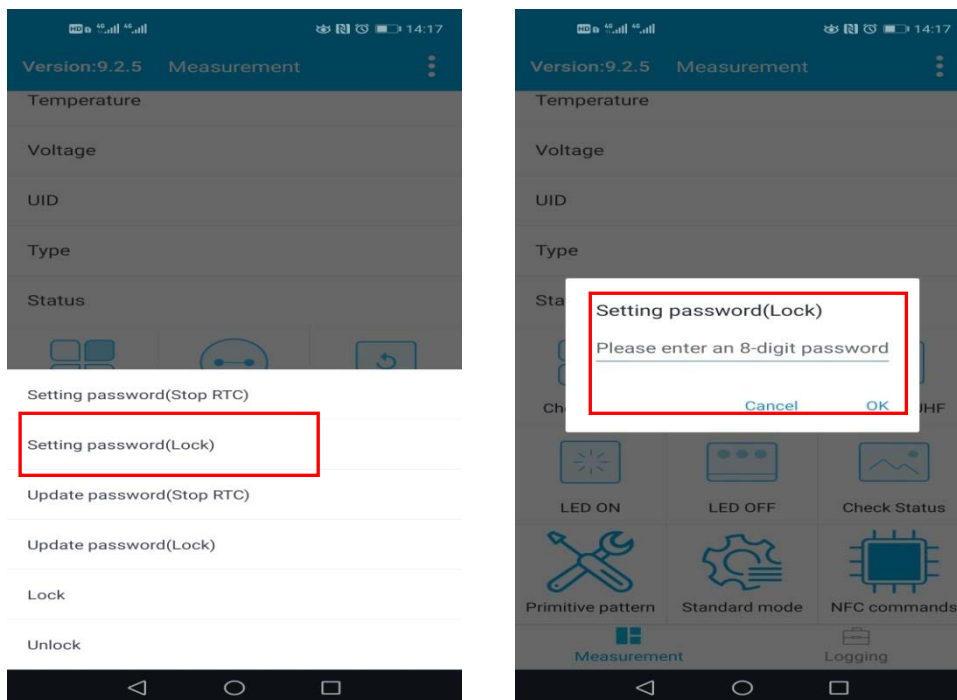
### 3.8.3 RTC STOP Password Update Password Process

Click the **update password (Stop RTC)** option, enter the interface that needs to update the password, enter the update password, then click the OK button, enter please close to the NFC label interface, mobile phone near the label to complete the password update



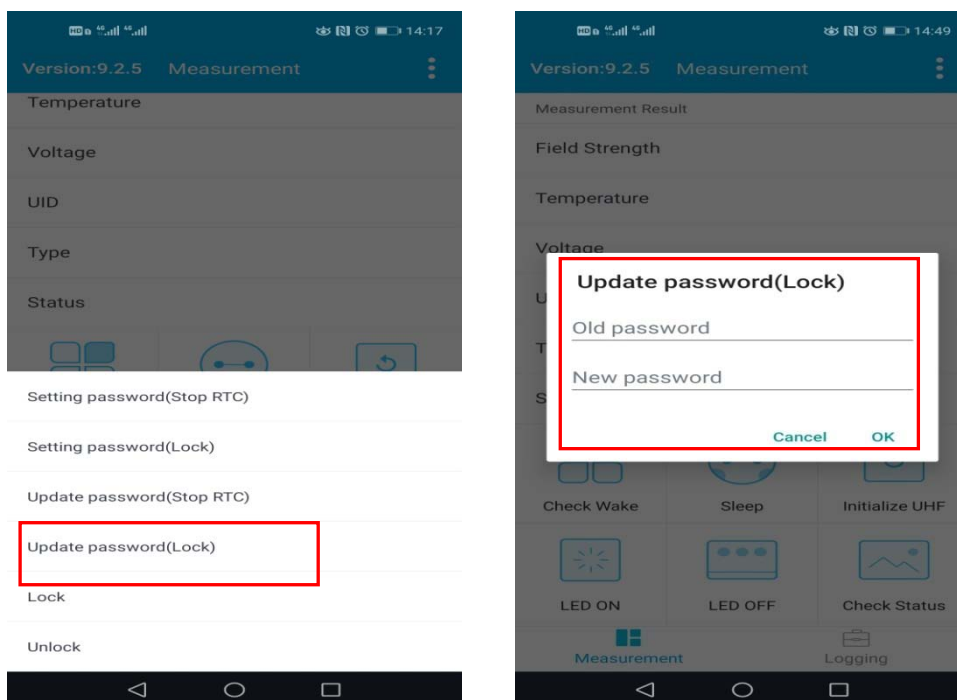
### 3.8.4 Lock Password Set Password Process

Click the **setting password (Lock)** option, enter the interface that needs to set the password, enter the password, then click the OK button, enter please close to the NFC label interface, mobile phone close to the label, complete the first password settings



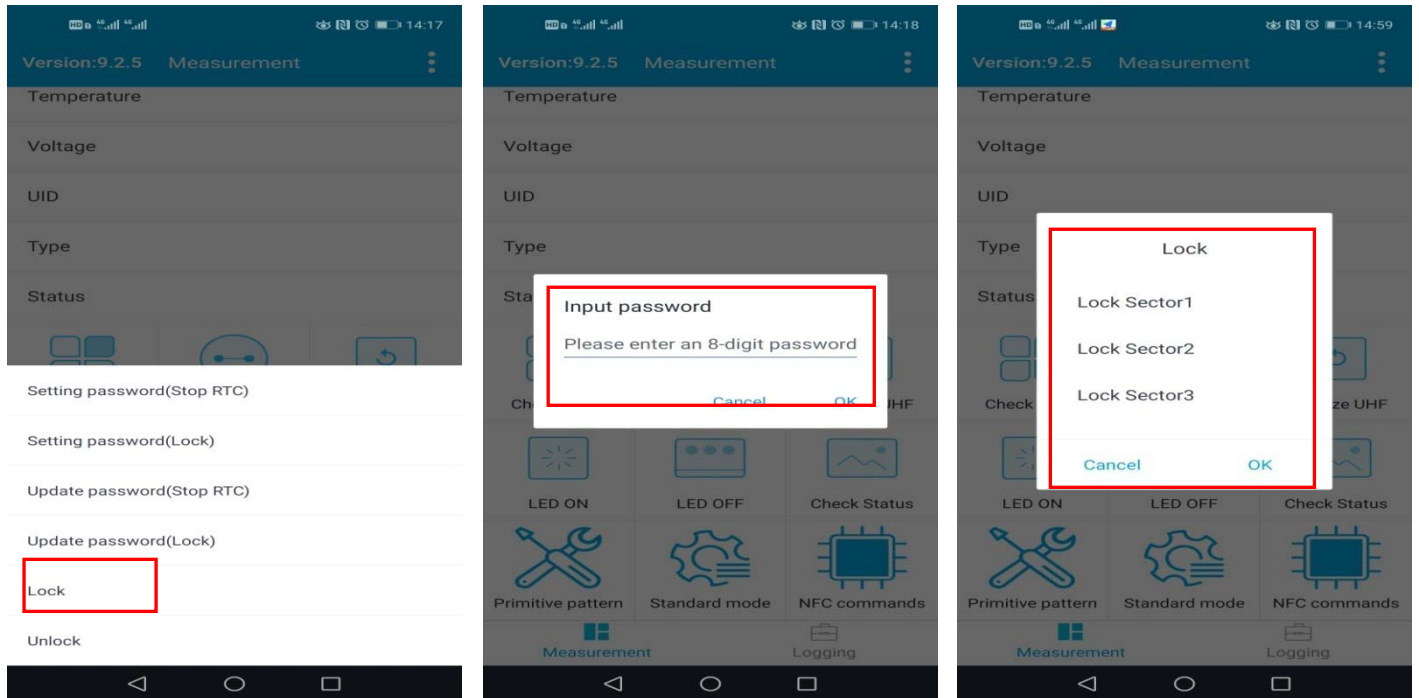
### 3.8.5 Lock Password Update Password Process

Click the **update password (Lock)** option, enter the interface that needs to update the password, enter the update password, then click the OK button, enter please close to the NFC label interface, mobile phone near the label to complete the password update



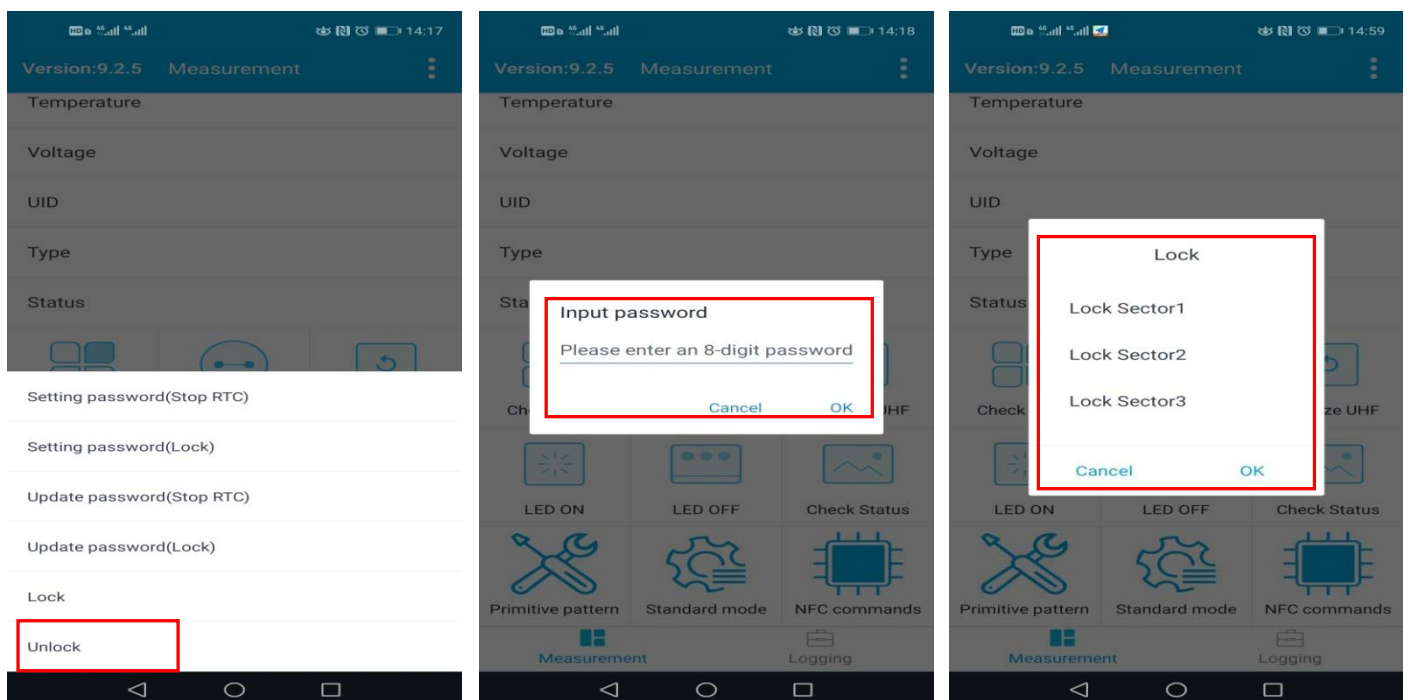
### 3.8.6 Lock process

Enter the settings interface, Click the **Lock** option, input the password ,click OK, select the user configuration area that needs to be locked, click OK, enter the near the label interface, and then the phone is close to the label.



### 3.8.7 unLock process

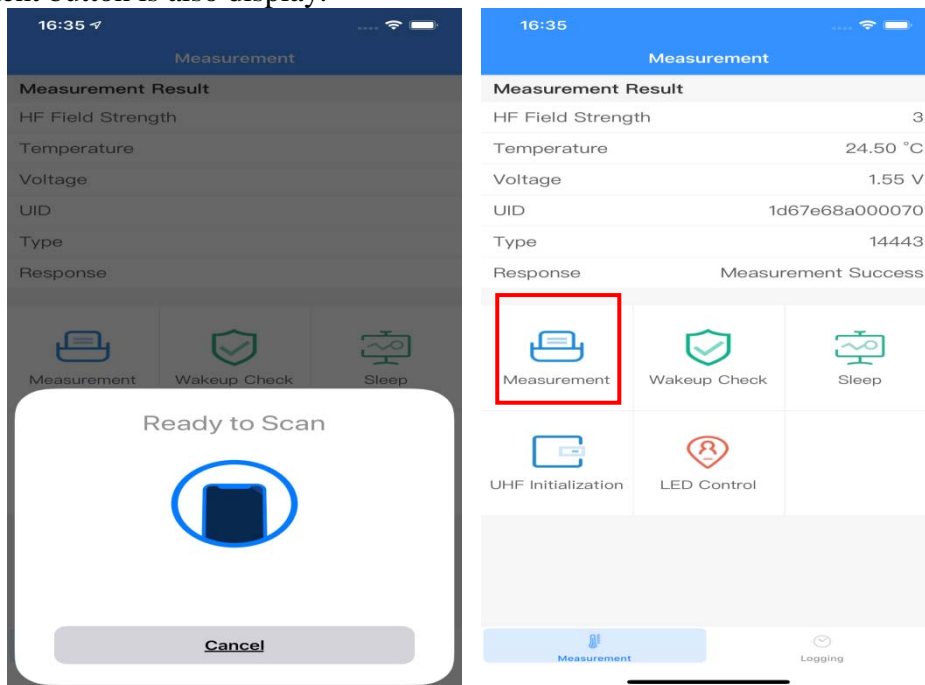
Enter the settings interface, Click the **UnLock** option, input the password ,click OK, select the user configuration area that needs to be locked, click OK, enter the near the label interface, and then the phone is close to the label.



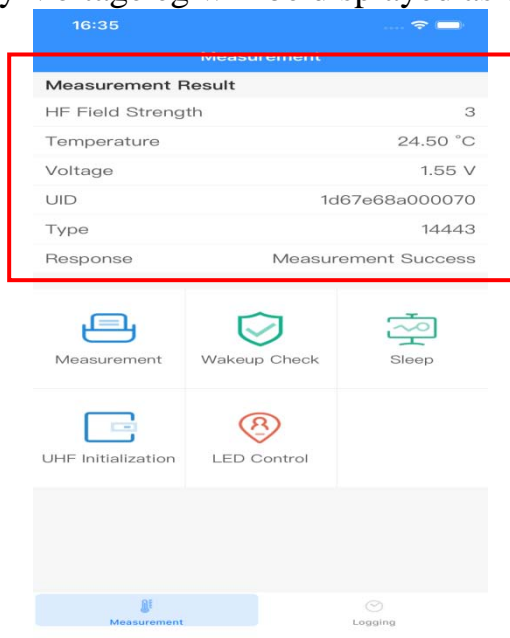
# 4 IOS phone Quick Start

## 4.1 Single time measurement

1. Launch the Android App, initial interface shown as below. Click measurement button is also display.



2. Hold the FM13DT160 demonstrator close to your smart phone. The Tag UID, Temperature, Battery Voltage eg will be displayed as below once a tag is found.

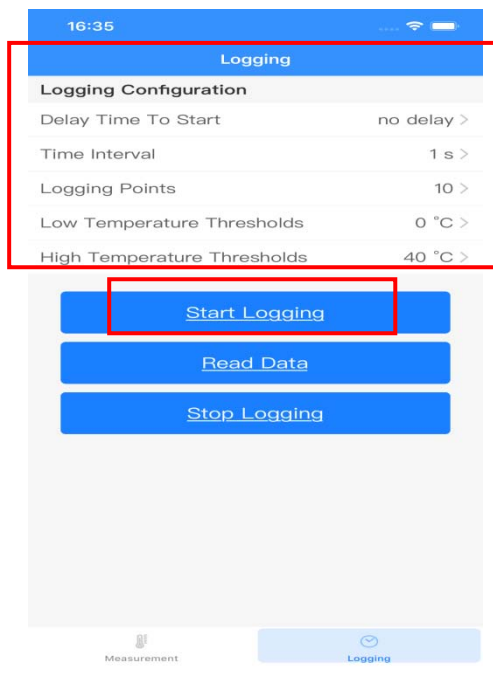


Notes: 1) The single temperature measurement is greatly affected by the field strength of the mobile phone, the height of the distance label of the mobile phone is different, and the temperature change is relatively large

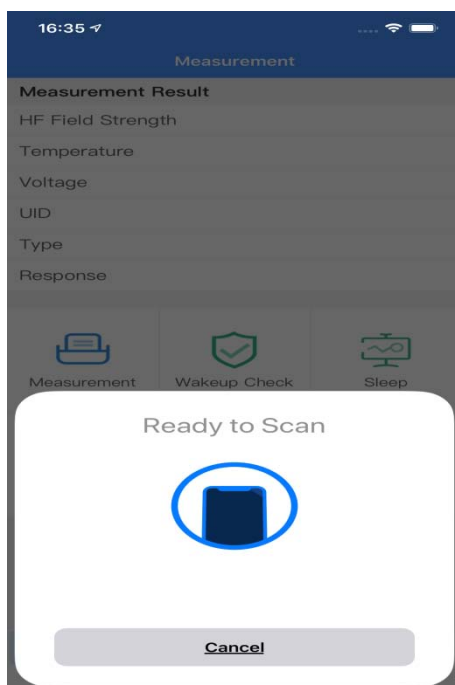
## 4.2 Logging Test

### 1. Logging Setting

1) After click the Logging button and setting the relevant parameters,turn on the Start Logging button.

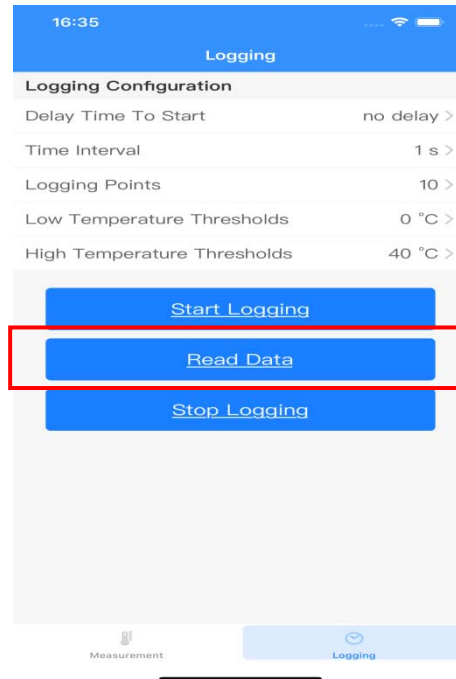


2) Approach the Tag, and The tag is starting logging process

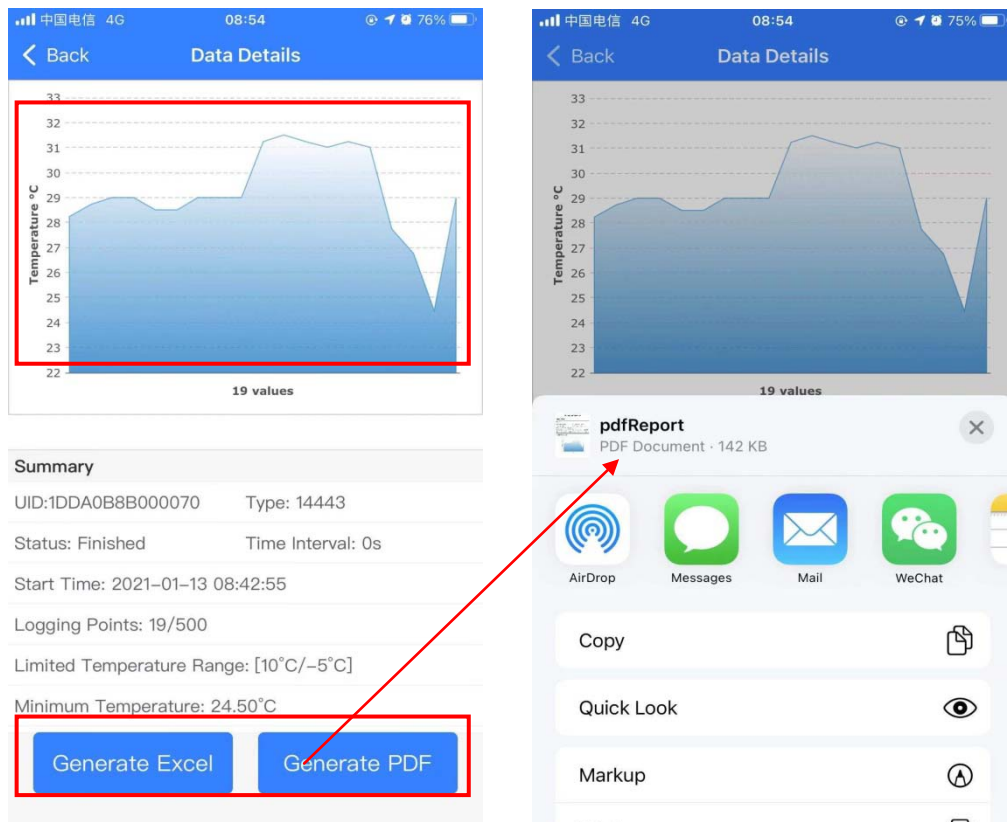


## 2. Logging data read

1) Wait for demo automatic test temperature setting times (LED flicker setting times the labe has no LED). Switch APP to the record read interface and let it close the demo board.



2) APP automatically generates temperature data curves and prompts for testing, and clicks the Generate PDF button or the Generate Excel button to generate the file and you can share it with the third APP.





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## 5 Version information

Rev	Release Data	Pages	Chapter or chart	Modifications
0.1	2018.12	13		Initial release
0.2	2019.3	14		Add IOS-iphone app quick start, updated testing screenshot, Smart Phone APP User Guide.
1.0	2019.10	16		updated APP version9.1.0
1.5	2019.12	19		Add IOS operation
1.6	2020.5	19		1.Delete Android Download link 2.Update lable image
1.7	2020.9	25		Software Version Update9.2.x, Add related functional descriptions
1.8	2021.02	26		Software Version Update9.2.x, Add PDF file temperature data format

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